

Special designs for special needs

Two rows are preferred. Extra bunk space, sound traction, and properly sized stalls in easy-to-work facilities are pluses.

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SPECIAL design considerations can have big returns for close-up and fresh cows. When building new housing, consider cow flow and cow health. Cows that may struggle to get to the parlor, such as lame cows, and those that must be milked more frequently, such as the postfresh mature cow group up to 21 days in milk, should be located nearest the parlor. A straw-bedded pack on a separate limb of the barn provides an excellent

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place for lame cows to recover, and an additional pen adjacent may be used for treatment cows.

Precalving heifers and dry cows are most easily managed in small groups of approximately 30 cows on either bedded packs or in free stalls. An area for individual calving pens can be immediately adjacent should they be required, depending on the grouping strategy. Located near these pens should be a storage area for pharmaceuticals and computer record access.

After calving, it is preferable to group fresh cows and heifers separately for a 10- to 21-day monitoring period. We prefer to see fresh cows with antibiotic residue milked in the main parlor and the milk diverted into a dump bucket, thereby avoiding group charges. Fresh cow groups are deliberately located adjacent to the main parlor to reduce turn-around time through the milking facility. This is particularly important when these cows are milked 4x to 6x a day.

An automated sort gate can be located in the return lane to the main barn so that cattle can be diverted into a work area for vaccination, hoof trimming, or other cow care tasks. The area should house a handling chute and hoof trimming chute, along with another work station for storage of materials and computer access.

In order for a single person to move a cow from one area to another in the barn, an access lane, usually 8 feet wide, is essential. This lane encircles the barn, and in each pen there is a set of sort gates in the corner. See Figure 1. The gates allow for transfer of the cow or examination in a simple headlock located adjacent to a stall.

There are three main options for stall layout within a pen, namely, three rows of stalls, or two rows of stalls head-to-head, or two rows of stalls tail-to-tail. We prefer two-row barns for transition cows to maximize feed bunk space.

The decision between which two-row layout to use is not clear. With head-to-head stalls, there will

be a row of stalls with easy access from the feed bunk alley for timid cows which may be bullied and inhibited from accessing a stall in a tail-to-tail design (where all cows must pass through a narrow access area to find a stall). However, the tail-to-tail design may be preferred where handling within the pen is important, as cows can be moved between the feed bunk alley and the rear alley more conveniently.

We, therefore, suggest using the tail-to-tail layout for the special needs barn, but recommend providing a crossover every 60 feet. This may be easily achieved if we build pens for approximately 30 cows. For cows beyond the transition period, a head-to-head design can be tolerated and probably carries some behavioral advantages with regard to stall access and lying times.

The rear alley in each pen should be at least 10 feet wide. The feed alley width should be at least 13 feet minimum in head-to-head pens, with stall access off the feed alley, and 12 feet in tail-to-tail pens. Alleys should slope 1.5 percent to allow drainage along their length and also slope away from the rear of the stall into the center of the alley to avoid puddles of urine collecting beneath the rear curb. New designs in Europe provide slope to the center. Manure passes below a tunnel where a scraper moves the material to outdoor storage.

Proper flooring type can prevent slippage and injury. Concrete and rubber are the most common flooring materials used at present. If concrete is used, it must be 3,500 psi air-entrained concrete, at least 4 to 5 inches thick, and grooved to reduce slipping.

Many barns have pen alleys with grooves running parallel to the long axis of the pen, often located 4 to 6 inches apart. This does not appear to offer maximum slip resistance. Parallel grooves 3/8

to 1/2 inch wide and deep, spaced 3 inches on center, appear to offer a reasonable compromise between a pattern that has optimal nonslip characteristics and one which is too difficult to cut into the concrete. This pattern increases the chances a cow's hoof will land on at least one groove as she walks, allowing manure trapped below the claw to be pushed along the grooves, facilitating contact between the concrete and the sole.

This pattern may, however, not be sufficient for crossovers and high-traffic areas where cows must make sharp turns. Here a diamond pattern is preferred, created with an additional set of oblique channels also located 3 inches apart to add additional grip.

Once the floor has been grooved, it should be finished with a floor grinder to smooth the surface and remove sharp or broken edges that may damage the cow's feet if left untended.

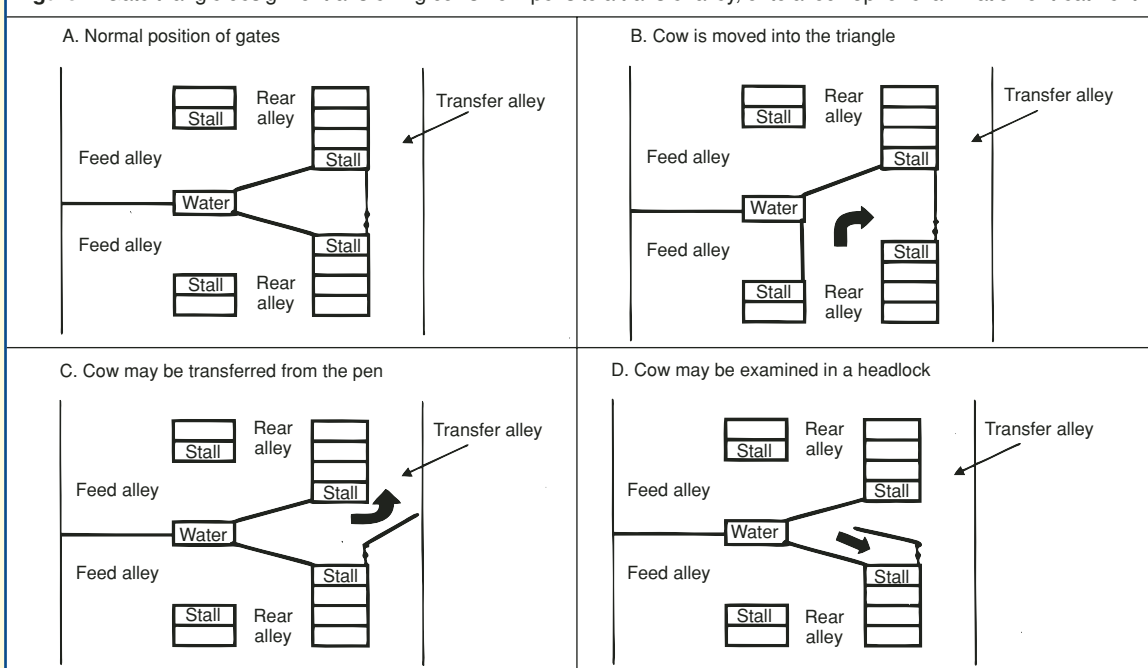
Stall design has been the subject of considerable interest and revision over the last two years. An improved awareness of the needs of the cow in terms of surface cushion and traction, a defined surface area to lie upon, freedom from lunge and "bob zone" obstructions, and room below and behind the neck rail to rise without hindrance, has led to a dramatic change in stall design recommendations.

Stall dimensions are given in detail in the table and in Figure 2 are based on the eye of the cows being housed. First-lactation heifers are typically 1,200 to 1,400 pounds, mature Holstein cows are 1,600 pounds, and pregnant prefresh cows are around 1,800 pounds.

Each pen should provide cows access to at least two water troughs. An ideal location for the trough is on the outside of each end of each pen, as it allows one trough to be shared by the cows from two adjacent pens.

Stall dimension, inches	Body weight estimates (pounds)			
	1,200	1,400	1,600	1,800
Total stall length facing wall	96	108	120	120
Head-to-head platform length	192	204	216	216
Distance from rear curb to brisket locator	66	68	70	72
Stall divider placement on center (stall width)	46	48	50	54
Height of brisket locator above stall surface	3	4	4	4
Height of upper edge of lower divider rail above stall surface	10	11	12	12
Height below neck rail	46	48	50	52
Horizontal distance between rear edge of neck rail and rear curb (minus width of rear curb in sand stall)	66 (60)	68(62)	70 (64)	72 (66)
Rear curb height	8	8	8	8
Rear curb width (loose bedded stalls)	6	6	6	6

Figure 1. Gate triangle design for transferring cows from pens to a transfer alley, or to a lock-up for examination or treatment.



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Figure 2. Sand-bedded free stall design using a wide-loop divider, with suggested dimensions for first-lactation, mature, and multiparous prefresh cows

